

PEV Charging at Premise

4/30/2010

Version 3.0

1 Descriptions of Function

All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work should be so noted.

1.1 Function Name

PEV Charging at Premise

1.2 Function ID

Identification number of the function

1.3 Brief Description

This scenario describes the most common sequence of the customer charging their PEV at their own premise. As described in the main Narrative section, the customer is attempting to charge a PEV under a selected PEV rate tariff that may provide an incentive to charge during off peak periods. The utility needs to support customers on the PEV program.

1.4 Narrative

This use case details the steps to charge the electric vehicle from the point of plugging the vehicle in at the Customer Premise to unplugging the electric vehicle from the charging station. This use case focuses mainly on the processes involved with the *Premise Mounted Electric Vehicle Supply Equipment (EVSE)*.

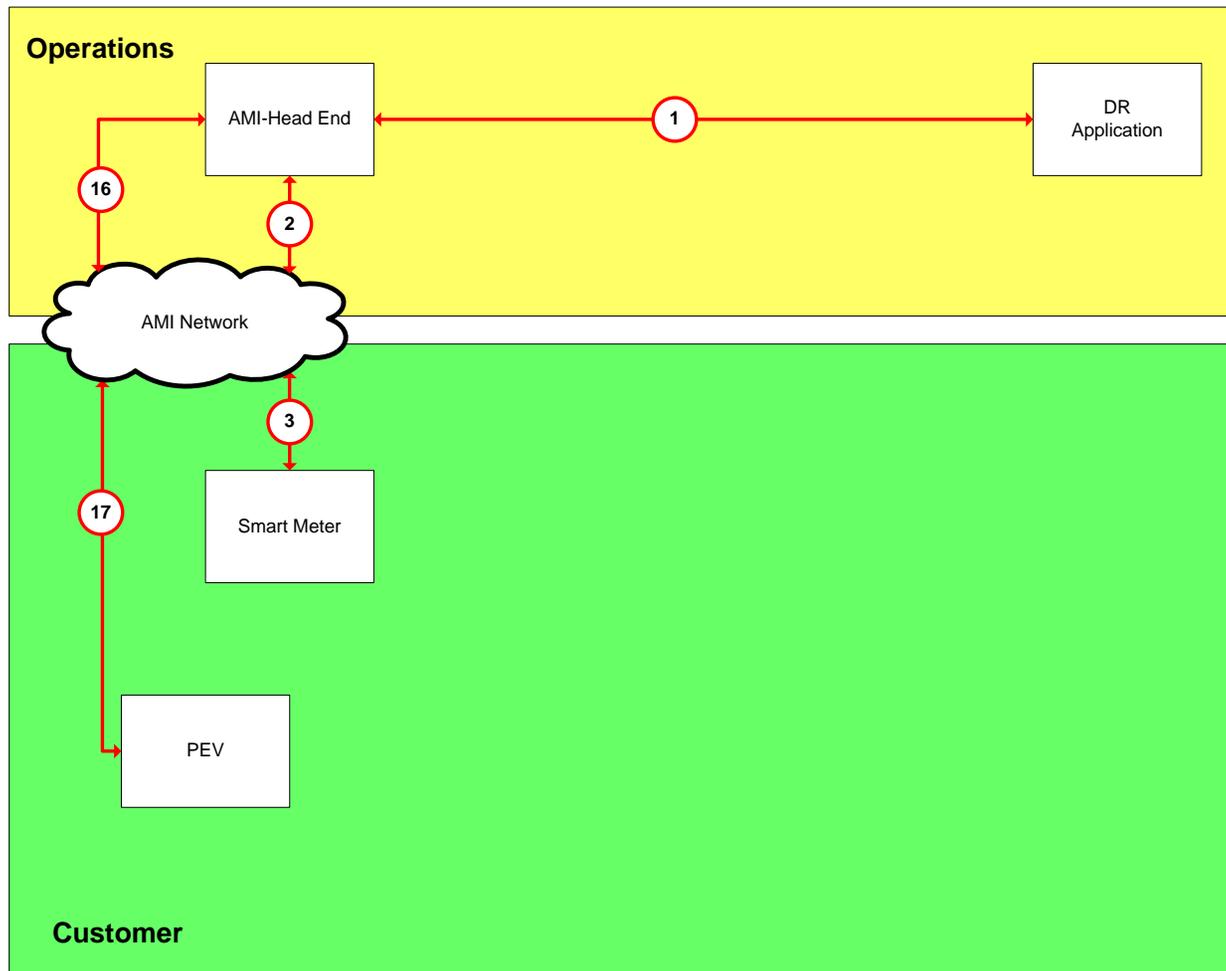


Figure 1-1
Context Diagram for Customer Charging at Premise

1.5 Actor (Stakeholder) Roles

<i>Grouping (Community)</i>		<i>Group Description</i>
<i>Actor Name</i>	<i>Actor Type (person, organization, device, system, or subsystem)</i>	<i>Actor Description</i>
Customer	Person	Customer of the Electric Service Provider. Contracts with the ESP to receive quality electrical service. Agrees to participate in Demand Response program. May or may not (at time of system operation) choose to participate
EVSE Cordset	Device	Charging Cordset for the PEV
Premise Mounted EVSE	Device	Charging station mounted at a premise
PEV Drive Interlock	Device	Safety feature to ensure the vehicle isn't allowed to move during the charging process
On-Board PEV Charging System	System	On-Board Charging system for the PEV or electric vehicle
PEV	Device	Plug-In Electric Vehicle
End Use Measurement Device	Device	(EUMD) Metering device used to gather charging data.
Premise Mounted EVSE Proximity Detection	Device	Feature to allow the charger to detect the proximity and make of the vehicle to charge
Premise Mounted EVSE Control Pilot	Device	Charging signal from the EVSE

1.6 Information exchanged

<i>Information Object Name</i>	<i>Information Object Description</i>
Activation Signal	Activation Signal to On-Board PEV Charging System from the Premise EVSE
PEV Drive Interlock Activation	Signal to lock the PEV driving mechanisms while charging
Verification of On-Board PEV Charging System Connection	Verification of acceptable charging match from EVSE to vehicle
Ready to Supply Energy	Signal to On-Board Charger that the EVSE is ready to deliver a charge
Ready to Accept Energy	Signal to the EVSE that the On-Boars Charger is ready to receive the charge
Verification of Equipment Ground	System check to insure that the proper grounding is in place for the EVSE to charge
Vehicle Ventilation Required	Calculation of emissions that will be generated during charge
Available Charge Current	Signal of available charge current, could depend on time of day, current pricing signals, EVSE charging limitations, On-Board Charging limitation, etc.
Energization	The vehicle is being charged
Energy	Energy is being delivered from the EVSE to the On-Board Charger
Pilot Signal	Charging signal from the EVSE
Charge Process Terminated	Signal to cease the charging process
Charging Information and Energy Supplied	Metering information concerning the charging cycle

1.7 Activities/Services

Describe or list the activities and services involved in this Function (in the context of this Function).

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>

1.8 Contracts/Regulations

Identify any overall (human-initiated) contracts, regulations, policies, financial considerations, engineering constraints, pollution constraints, and other environmental quality issues that affect the design and requirements of the Function.

<i>Contract/Regulation</i>	<i>Impact of Contract/Regulation on Function</i>

<i>Policy</i>	<i>From Actor</i>	<i>May</i>	<i>Shall Not</i>	<i>Shall</i>	<i>Description (verb)</i>	<i>To Actor</i>

<i>Constraint</i>	<i>Type</i>	<i>Description</i>	<i>Applies to</i>

2 Step by Step Analysis of Function

Describe steps that implement the function. If there is more than one set of steps that are relevant, make a copy of the following section grouping (Steps to implement function, Preconditions and Assumptions, Steps normal sequence, Post-conditions) and provide each copy with its own sequence name.

2.1 Steps to implement function – Name of Sequence

Charging PEV at Premise

2.1.1 Preconditions and Assumptions

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
Engineering Modeling	Engineering Modeling will need to be done before a Premise Mounted EVSE will be installed.
Customer	Customer should be signed up for the TOUCPP Program
Customer	Customer Premise Mounted EVSE charging preferences are loaded into the EMS upon registration for the Smart Charging Program
Premise Mounted EVSE	Customer EVSE charging preferences are loaded into the Customer Premise Mounted EVSE upon installation.
Premise Mounted EVSE	The Premise Mounted EVSE has been registered with the EMS
Customer	Customer installation shall meet with the Utility's design criteria
Premise Mounted EVSE	Premise Mounted EVSE will have the same pricing information as its parent Smart Meter
Smart Meter	The Smart Meter will have the current price and the next price

2.1.2 Steps – Name of Sequence

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
#	<i>Triggering event? Identify the name of the event.¹</i>	<i>What other actors are primarily responsible for the Process/Activity? Actors are defined in section 1.5.</i>	<i>Label that would appear in a process diagram. Use action verbs when naming activity.</i>	<i>Describe the actions that take place in active and present tense. The step should be a descriptive noun/verb phrase that portrays an outline summary of the step. "If ...Then...Else" scenarios can be captured as multiple Actions or as separate steps.</i>	<i>What other actors are primarily responsible for Producing the information? Actors are defined in section 1.5.</i>	<i>What other actors are primarily responsible for Receiving the information? Actors are defined in section 1.5. (Note – May leave blank if same as Primary Actor)</i>	<i>Name of the information object. Information objects are defined in section 1.6</i>	<i>Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren't captured in the spreadsheet.</i>	<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
1.1	Customer plugs in vehicle for charging	Customer	Connect PEV	Customer connects PEV at their premise location. Customer can plug in their PEV using either ESVE Cordset or Premise EVSE for charging					
1.2 A		Customer	Connect Cordset	Customer connects EVSE Cordset to Energy Portal at Premise.					
1.2 B		Customer	Connect to Premise EVSE	Customer connects Premise Mounted EVSE to PEV.				We will only refer to the Premise Mounted EVSE hereafter in this Use Case	

¹ Note – A triggering event is not necessary if the completion of the prior step – leads to the transition of the following step.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.3		Premise Mounted EVSE	Premise Mounted EVSE Control Pilot Activates Charging System	Premise Mounted EVSE Control Pilot sends Activation Signal to On-Board PEV Charging System	Premise Mounted EVSE Control Pilot	On-Board PEV Charging System	Activation Signal		
1.4		Premise Mounted EVSE	Proximity Detection	Premise Mounted EVSE Proximity Detection sends PEV Drive Interlock Activation	Premise Mounted EVSE Proximity Detection	PEV Drive Interlock	PEV Drive Interlock Activation		
1.5		Premise Mounted EVSE	Charging System Connected	Premise Mounted EVSE Verification of On-Board PEV Charging System Connection	Premise Mounted EVSE	On-Board PEV Charging System	Verification of On-Board PEV Charging System Connection		
1.6		Premise Mounted EVSE	Ready to Supply Energy	Premise Mounted EVSE tells On-Board PEV Charging System that it is Ready to Supply Energy	Premise Mounted EVSE	On-Board PEV Charging System	Ready to Supply Energy		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.7		On-Board PEV Charging System	Ready to Accept Energy	On-Board PEV Charging System tells Premise Mounted EVSE it is Ready to Accept Energy	On-Board PEV Charging System	Premise Mounted EVSE	Ready to Accept Energy		
1.8		Premise Mounted EVSE	Verification of Equipment Ground	Premise Mounted EVSE Verification of Equipment Ground	Premise Mounted EVSE	Premise Mounted EVSE	Verification of Equipment Ground		
1.9		Premise Mounted EVSE	Vehicle Ventilation	Premise Mounted EVSE determines whether Vehicle Ventilation Required	Premise Mounted EVSE	Premise Mounted EVSE	Vehicle Ventilation Required		
1.10		On-Board PEV Charging System	Determines Available Charge Current	On-Board PEV Charging System determines Available Charge Current from Premise Mounted EVSE	Premise Mounted EVSE	On-Board PEV Charging System	Available Charge Current		
1.11		Premise Mounted EVSE	Energize the On-Board PEV Charging System	Premise Mounted EVSE energizes the On-Board PEV Charging System	Premise Mounted EVSE	On-Board PEV Charging System	Energization		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.12		Premise Mounted EVSE	Deliver Energy	Premise Mounted EVSE delivers energy to the On-Board PEV Charging System	Premise Mounted EVSE	On-Board PEV Charging System	Energy	PEV begins charging based on Customer-selected preferences. Charging may be delayed based upon Customer preferences or grid reliability criteria (e.g., offpeak economy charging, demand response event underway, short, randomized charging delay to promote grid stability, etc.)	

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environment
1.13		Premise Mounted EVSE	Monitor Pilot Signal	On-Board PEV Charging System continuously monitors Premise Mounted EVSE Pilot Signal and adjusts charge rate accordingly	Premise Mounted EVSE	On-Board PEV Charging System	Pilot Signal		
1.14		Premise Mounted EVSE	Charge Process terminated	Charge Process Terminated when Premise Mounted EVSE is turned off and/or connector is removed	Premise Mounted EVSE	Premise Mounted EVSE	Charge Process Terminated		
1.15		End Use Measurement Device (EUMD)	Record Charging Info	EUMD located in the Premise Mounted EVSE records and delivers Charging Information and Energy Supplied to Premise Mounted EVSE for each charging session.	End Use Measurement Device	End Use Measurement Device	Charging Information and Energy Supplied		

2.1.3 Post-conditions and Significant Results

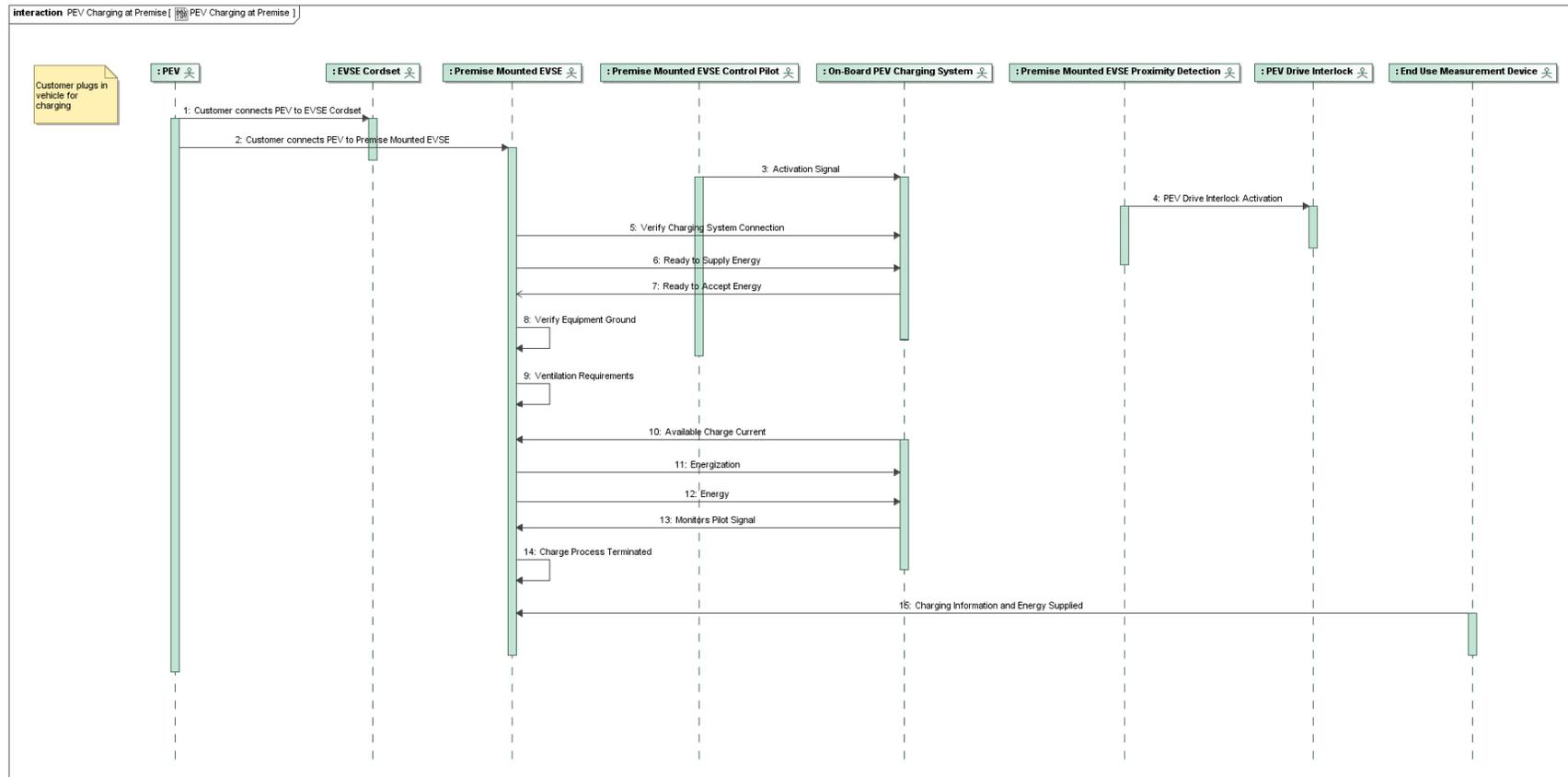
Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>

2.2 Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number.

2.3 Diagrams



PEV Charging at Premise Sequence Diagram

3 Auxiliary Issues

3.1 References and contacts

Documents and individuals or organizations used as background to the function described; other functions referenced by this function, or acting as “sub” functions; or other documentation that clarifies the requirements or activities described. All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work must be so noted.

ID	Title or contact	Reference or contact information
[1]		

3.2 Action Item List

As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.

ID	Description	Status
[1]		

3.3 Revision History

No	Date	Author	Description
1.1	3/25/2010	Brian D. Green	Original Use Case
1.2	3/31/2010	Brian D. Green	Clean-Up Steps
2.0	4/12/2010	Brian D. Green	Add additional steps per the Utility’s request.
3.0	4/30/2010	Brian D. Green	Add revisions and diagrams